IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

LINGLE et al. Atty. Ref.: 3691-663; Confirmation No. 6810

Appl. No. 10/800,012 TC/A.U. 1775

Filed: March 15, 2004 Examiner: Blackwell, G.

For: COATED ARTICLE WITH LOW-E COATING INCLUDING IR REFLECTING LAYER(S) AND CORRESPONDING METHOD

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August 6, 2007

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

RULE 131 DECLARATION

1. We, Anton Dietrich, Philip Lingle, and Jens-Peter Müller are the inventors of the instant patent application, assigned U.S. Serial No. 10/800,012 filed February March 15, 2004. We have been working in the art of glass coatings and materials for years.

2. We invented and reduced to practice examples of the instant invention in at least Luxembourg in or prior to December of 2003, which is prior to the January 8, 2004 publication date of US 2004/0005467 to Neuman.

3. For example and without limitation, prior to January 8, 2004 we made at least one heat treated coated article comprising a coating supported by a glass substrate, the coating comprising: a first layer comprising silicon nitride which is located on and directly contacts a surface of the glass substrate; a first layer comprising zinc oxide located over at least the first

layer comprising silicon nitride; a first infrared (IR) reflecting layer comprising silver located over and contacting the first layer comprising zinc oxide; a second layer comprising silicon nitride located over at least the first IR reflecting layer; a second layer comprising zinc oxide located over at least the second layer comprising silicon nitride; a second IR reflecting layer comprising silver located over and contacting the second layer comprising zinc oxide; a layer comprising an oxide of Ni and/or Cr located over and contacting the second IR reflecting layer; a layer comprising tin oxide located over at least the layer comprising an oxide of Ni and/or Cr; a layer comprising silicon nitride located over and contacting the layer comprising tin oxide, wherein the layer comprising tin oxide is significantly thicker than the layer comprising silicon nitride; and wherein the coated article following heat treatment, measured monolithically, has a sheet resistance of less or equal to 2.5 ohms/square, a haze value of less than or equal to 0.35, and a visible transmission of at least 80%.

4. Attached hereto as Exhibit 1 is a portion of our DOE#13 which was performed in or prior to December of 2003. Sample #62 (i.e., D13-062) set forth in Exhibit 1 was made in November of 2003 and was a heat treated coated article comprising a coating supported by a glass substrate, the coating comprising: a first layer comprising silicon nitride which is located on and directly contacts a surface of the glass substrate; a first layer comprising zinc oxide located over at least the first layer comprising silicon nitride; a first infrared (IR) reflecting layer comprising silver located over and contacting the first layer comprising zinc oxide; a second layer comprising silicon nitride located over at least the first IR reflecting layer; a second layer comprising zinc oxide located over at least the second layer comprising silicon nitride; a second IR reflecting layer comprising silver located over and contacting the second layer comprising zinc oxide; a layer comprising an oxide of Ni and/or Cr located over and contacting the second

IR reflecting layer; a layer comprising tin oxide located over at least the layer comprising an oxide of Ni and/or Cr; a layer comprising silicon nitride located over and contacting the layer comprising tin oxide, wherein the layer comprising tin oxide is significantly thicker than the layer comprising silicon nitride; and wherein the coated article following heat treatment, measured monolithically, has a sheet resistance of less or equal to 2.5 ohms/square, a haze value of less than or equal to 0.35, and a visible transmission of at least 80%. This reduction to practice occurred in at least Luxembourg.

5. Note the layer stack for sample #62 (i.e., D13-062) on the first page of Ex. 1 which sets forth a stack: glass/SiN/ZnO/Ag/NiCrOx/SnO/ SiN/ZnO/Ag/NiCrOx/SnO/SiN/air. The first page of Ex. 1 also indicates that in sample #62 the top tin oxide layer had a thickness of 29.36 nm and the top silicon nitride layer had a thickness of 12.00 nm, so that the top tin oxide layer was thicker than the top silicon nitride layer in sample #62. On page 4 of Ex. 1, in the central area of the page, the column TTRAN indicates that after heat treatment the coated article of #62 (i.e., D13C-062H-16) had a visible transmission of at least 80%. Additionally, pages 5-6 of Ex. 1 show that after heat treatment the coated article of sample #62 has a visible transmission of at least 80%, a sheet resistance (RES) of less than 3.0, and a haze value (Haze) of less than or equal to 0.35.

6. Ex. 2 attached hereto is a page from a memo dated November 28, 2003 showing that sample #62 used a thicker tin oxide layer under the top silicon nitride.

7. We hereby declare that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States

Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Philip J. Lingle

Jens-Peter Müller

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DOE #13

Design:

Design: Des-D13-333-16
Reference Wavele 530
Incident Angle (de 0

Layer Medium	Material	Packing Density	Refractive Index	Extinction Coefficient	D13-333 pos 16	D13-364 pos 16	D13-376 pos 16	D13-062 Pos 16	D13-068 Pos 16
	Air		1	0					
1	SiNx - H G3/ (SiOx)	0.97	2.04	0.0019	22.54	22.54	22.23	12.00	20.00
2	SnO2-/ (ZnO)	1.00	1.98	0.0103	15.00	10.20	15.75	29.36	15.35
3	NiCrOx-Full	1.00	2.37	0.0680	2.50	2.50	2.50	2.50	2.50
4	Ag-G3-Jens	1.00	0.13	3.2323	10.28	10.41	10.52	10.10	10.43
5	ZnO-H-G3	1.00	2.00	0.0009	9.50	9.50	9.50	9.50	9.50
6	SiNx - H G3	1.00	2.07	0.0019	13.00	13.00	13.00	13.00	13.00
7	SnO2-06FC-H	1.00	1.98	0.0103	59.41	59.36	43.20	57.63	57.17
8	NiCrOx-Full	1.00	2.37	0.0680	2.50	2.50	2.50	2.50	2.50
9	Ag-G3-Jens	1.00	0.13	3.2323	10.66	10.61	10.65	10.44	10.49
10	ZnO-H-G3	1.00	2.00	0.0009	9.50	9.50	9.50	9.50	9.50
11	SiNx - H G3	1.00	2.07	0.0019	18.14	18.76	21.67	18.00	18.47
Substrate	SLClear		1.526	0					
	Top dielectric total thickness (nm)				37.5	32.7	38.0	41.4	35.3
	Centerdielectric total thickness (nm)				84.4	84.4	68.2	82.6	82.2
	Bottom dielectric total thickness (nm)				27.6	28.3	31.2	27.5	28.0
	Total Dielectrics				149.6	145.4	137.4	151.5	145.5
				measured					
Mono Heated	RF Y (C/2)			7.29	7.28	8.28	7.45	6.59	7.12
	RFM L* (C/2)			32.47	32.44	34.56	32.81	30.84	32.09
	RFM a* (C/2)			-3.29	-3.57	-12.77	-4.07	3.01	-8.12
	RFM b* (C/2)			15.35	15.17	17.05	4.46	8.28	15.26
	RG Y (C/2)			8.08	8.60	9.38	9.75	7.91	8.61
	RGM L* (C/2)			34.14	35.21	36.70	37.40	33.79	35.23
	RGM a* (C/2)			5.71	4.42	-5.30	0.05	10.60	-1.55
	RGM b* (C/2)			6.84	8.78	14.55	12.19	2.32	12.63

1 7.9x3

	TM Y (C/2)	78.78	78.88	78.13	77.14	79.24	80.27
	TM L* (C/2)	91.14	91.18	90.84	90.39	91.34	91.81
	TM a* (C/2)	-2.13	-1.65	0.04	-1.31	-2.70	-0.71
	TM b* (C/2)	-1.09	-1.56	-2.08	-1.42	-0.63	-1.33
Lami	RF Y (D65/10)	9.05	8.57	8.98	9.36	8.09	8.31
	RFM L* (D65/10)	36.09	35.15	35.94	36.67	34.17	34.62
	RFM a* (D65/10)	-2.73	-1.18	-3.84	10.23	1.62	-0.23
	RFM b* (D65/10)	-7.57	-8.33	-7.09	7.03	-8.55	-6.41
	TM Y (D65/10)	77.26	76.18	75.94	74.06	76.37	77.61
	TM L* (D65/10)	90.44	89.94	89.83	88.95	90.03	90.60
	TM a* (D65/10)	-2.62	-2.72	-2.15	-5.14	-3.24	-2.70
	TM b* (D65/10)	3.56	3.33	3.01	-1.18	3.28	3.03
Delta Y		1.52	2.70	2.19	3.08	2.87	2.66

Stack

	D13-068H		#385 L		SiOx -Top 068H		SiOx -Top 068L	
Waveleng	RF D13-068H Sim	T D13-068H Sim	RF #385 L S	T #385 L Sir	RF SiOx -To	T SiOx -Top	RF SiOx -Top	T SiOx -Top 068L Sim
360	12.37	49.94	4.56	0.00	5.32	49.41	4.56	0.00
380	9.02	64.60	4.97	15.37	3.27	67.10	4.99	14.98
400	6.16	74.14	10.08	61.82	3.44	76.53	11.94	60.38
420	4.24	79.10	10.72	70.40	4.85	79.42	13.63	68.62
440	3.34	81.73	10.49	72.91	6.51	79.92	13.62	70.94
460	3.51	82.96	10.26	75.07	7.91	79.93	13.31	73.05
480	4.45	82.96	9.91	76.53	8.91	79.71	12.72	74.60
500	5.75	82.25	9.47	77.62	9.48	79.51	11.96	75.89
520	6.97	81.35	8.94	78.38	9.56	79.53	11.03	76.95
540	7.80	80.48	8.33	78.69	9.15	79.73	9.97	77.64
560	8.10	79.87	7.74	78.72	8.28	80.14	8.93	78.09
580	7.84	79.54	7.32	78.27	7.06	80.68	8.07	78.07
600	7.12	79.37	7.22	77.26	5.64	81.15	7.60	77.44
620	6.13	79.20	7.60	75.62	4.29	81.34	7.73	76.07
640	5.14	78.82	8.63	73.25	3.29	81.01	8.63	73.87
660	4.52	77.95	10.42	70.11	3.03	79.90	10.42	70.78

680	4.57	76.24	12.90	66.11	3.79	77.67	13.03	66.71
700	5.66	73.65	16.07	61.63	5.84	74.38	16.42	62.08
720	7.94	70.11	19.61	56.68	9.20	70.07	20.23	56.94
740	11.50	65.73	23.53	51.69	13.80	64.96	24.41	51.74
760	16.10	60.62	27.55	46.80	19.27	59.26	28.68	46.66
780	21.51	55.10	31.57	42.11	25.31	53.34	32.90	41.81
800	28.52	48.46	36.21	36.90	32.72	46.47	37.70	36.48

	D13C-062A-16			D13C-062H-16			D13C-062L-16			
Measurem	D13C-062A-1	D13C-062A-	D13C-062A	D13C-062H	D13C-062H-1(	D13C-062H	D13C-062L	D13C-062L	D13C-062L-16	RG
Date	26-Nov-03	26-Nov-03	26-Nov-03	27-Nov-03	27-Nov-03	27-Nov-03	27-Nov-03	27-Nov-03	27-Nov-03	
Time	21:05	21:02	21:03	2:13	2:07	2:11	2:37	2:37	2:38	
Standardiz:	TTRAN	RSIN	RSIN	TTRAN	RSIN	RSIN	TTRAN	RSIN	RSIN	
Extra ID										
Y 2\C	77.11	6.24	7.52	80.07	6.97	7.93	77.89	8.4	8.66	
L* 2\C	90.37	30.02	32.96	91.71	31.74	33.84	90.73	34.8	35.32	
a* 2\C	-4.82	7.08	15.16	-3.43	2.5	10.56	-4.15	2.04	5.58	
b* 2\C	3.87	5.62	-4.97	0.48	10.19	1.92	3.84	-8.35	-11.11	
Y 10\D65	77.08	6.05	7.4	80.22	6.75	7.74	77.75	8.55	8.84	
L* 10\D65	90.36	29.54	32.7	91.78	31.24	33.43	90.66	35.1	35.67	
a* 10\D65	-4.53	9.25	15.55	-3.5	5.02	11.99	-3.45	0.53	3.52	
b* 10\D65	4.27	3.84	-6.38	0.83	8.65	0.25	3.96	-8.1	-10.87	
Y 2\A	76.6	6.68	8.11	79.37	7.34	8.52	77.51	8.22	8.55	
360	33.3	25.09	17.39	46.96	23.03	18.07	46.62	17.41	13.96	
370	38	22.81	17.94	53.3	20.14	18.91	52.77	16.54	14.93	
380	43.75	19.46	17.99	59.04	16.75	18.7	57.33	15.38	15.47	
390	49.73	16.16	17.75	64.04	13.7	17.83	61.65	14.4	15.61	
400	55.1	13.39	16.95	68.19	11.32	16.17	65.11	13.7	15.33	
410	59.75	10.93	15.63	71.52	9.28	14.19	67.36	13.01	14.87	
420	63.66	8.84	14.09	74.15	7.55	12.24	68.97	12.41	14.33	
430	66.9	7.12	12.44	76.14	6.09	10.34	70.16	11.88	13.75	
440	69.8	5.74	10.73	77.97	5.03	8.66	71.4	11.47	13.18	
450	72.2	4.7	9.11	79.48	4.27	7.26	72.65	11.1	12.58	
460	74.38	3.96	7.67	80.8	3.82	6.12	73.96	10.81	12.03	
470	75.97	3.5	6.49	81.76	3.63	5.33	75.06	10.51	11.49	
480	77.36	3.28	5.59	82.51	3.68	4.86	76.18	10.25	10.93	
490	78.22	3.31	5.04	82.79	3.91	4.7	76.89	9.98	10.44	
500	78.88	3.53	4.79	82.9	4.34	4.83	77.67	9.7	9.97	
510	79.2	3.96	4.84	82.77	4.91	5.19	78.31	9.44	9.54	
520	79.24	4.48	5.13	82.46	5.54	5.72	78.79	9.15	9.15	
530	79.04	5.05	5.59	81.97	6.15	6.33	79.08	8.84	8.79	
540	78.67	5.66	6.18	81.41	6.74	6.99	79.26	8.54	8.48	
550	78.19	6.25	6.84	80.79	7.27	7.65	79.29	8.24	8.2	
560	77.59	6.8	7.55	80.15	7.72	8.3	79.21	7.96	7.99	

Haze	0.14	0.16	0.15	0.19	0.24

Haze	0.14	0.21	0.31	0.37	0.59

Haze

Heated @ 625c S&T Box furnace

54

	6	8	10	12	14
T%	79.8	79.54	79.33	78.43	78.24
a*	-1.85	-1.75	-1.7	-1.6	-1.65
b*	-0.18	-0.61	-0.81	-1.2	-1.37
L*	91.6	91.48	91.38	90.98	90.89
RG Y	8.15	8.33	8.38	8.65	8.71
a*	-0.06	-0.07	0.25	0.53	0.8
b*	11.58	12.47	12.28	12.64	12.65
L*	34.3	34.67	34.76	35.31	35.42
RF Y	6.68	6.79	6.81	6.95	6.96
a*	-6.51	-6.52	-6.28	-6.27	-6.04
b*	10.14	11.02	10.72	10.9	10.79
L*	31.06	31.32	31.36	31.69	31.72
RES	2.25	2.18	2.21	2.18	2.24
Haze	0.10	0.14	0.19	0.29	0.33

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	6	8	10	12	14
T%	79.55	79.71	78.92	78.85	78.33
a*	-1.65	-1.73	-1.46	-1.41	-1.46
b*	-0.43	-0.53	-0.7	-0.93	-0.93
L*	91.48	91.55	91.2	91.17	90.93
RG Y	8.47	8.44	8.4	8.47	8.5
a*	-0.15	0.21	0.69	0.68	1.01
b*	12.76	12.7	12.2	12.51	12.04
L*	34.94	34.88	34.8	34.95	35
RF Y	7.43	7.36	7.22	7.22	7.24
a*	-7.57	-7.11	-6.7	-6.57	-6.45
b*	16.17	15.87	15.62	15.64	15.29
L*	32.77	32.6	32.31	32.31	32.35
RES	2.29	2.23	2.26	2.23	2.23
Haze	0.12	0.14	0.17	0.17	0.21

	6
T%	80.88
a*	-1.54
b*	-0.42
L*	92.08
RG Y	8.04
a*	-0.74
b*	9.32
L*	34.06
RF Y	7.19
a*	-7.94
b*	14.35
L*	32.23
RES	2.24
Haze	0.12

73

	6	8	10	12	14
T%	78.32	78.34	78.07	78.05	78.13
a*	-0.37	-0.61	-0.64	-0.65	-0.77
b*	-2.48	-2.52	-2.59	-2.61	-2.54
L*	90.92	90.93	90.81	90.8	90.84
RG Y	8.61	8.58	8.65	8.72	8.66
a*	-2.35	-1.51	-1.57	-1.66	-1.6
b*	12.54	12.46	12.75	12.92	12.72
L*	35.22	35.16	35.31	35.44	35.32
RF Y	7.09	7.08	7.14	7.23	7.14
a*	-9.01	-8.34	-8.59	-8.77	-8.75
b*	13	13.33	13.55	13.76	13.52

62

	6	8	10	12	14
T%	80.39	80.42	80.33	79.77	79.36
a*	-3.45	-3.46	-3.32	-3.34	-3.45
b*	0.69	0.62	0.29	-0.01	0.08
L*	91.86	91.88	91.83	91.58	91.4
RG Y	7.85	7.77	7.9	8.02	7.22
a*	9.53	9.73	9.45	9.79	2.57
b*	2.93	2.61	3.48	3.52	11.14
L*	33.67	33.5	33.77	34.03	32.31
RF Y	7.01	6.93	7.06	7.2	7.19
a*	1.85	2.09	1.76	1.99	2.5
b*	11.59	10.98	11.6	11.68	11.11

T%
a*
b*
L*
RG Y
a*
b*
L*
RF Y
a*
b*

#62 (cont)

L*	32.02	31.98	32.12	32.33	32.13
RES	2.10	2.08	2.06	2.06	2.05
Haze	0.17	0.13	0.18	0.20	0.19

L*	31.84	31.65	31.93	32.27	32.23
RES	2.30	2.28	2.28	2.23	2.34
Haze	0.16	0.15	0.19	0.27	0.36

L*
RES
Haze

Heated @ 675c S&T Box furnace

54

	6 min	8 min	10 min	12 min	14 min
T%	78.34	76.72	75.81	75.19	74.37
a*	-1.44	-1.76	-1.92	-1.95	-2.24
b*	-1.32	-2.06	-2.56	-2.98	-3.14
L*	90.94	90.19	89.77	89.48	89.10
RG Y	8.85	9.15	9.20	9.44	9.37
a*	-0.88	-0.37	-0.24	-0.71	0.07
b*	15.21	15.39	15.67	16.16	15.41
L*	35.70	36.28	36.36	36.82	36.68
RF Y	7.24	7.11	7.01	7.01	6.94
a*	-8.05	-8.20	-9.04	-9.26	-9.17
b*	14.55	14.19	13.89	13.76	12.75
L*	32.36	32.07	31.83	31.83	31.68
RES	2.19	2.25	2.33	2.32	2.47
Haze	0.24	0.27	0.26	0.39	3.14

58

	6 min	8 min	10 min	12 min	14 min
T%	78.81	77.25	76.18	75.00	74.62
a*	-1.56	-1.78	-2.01	-2.29	-2.42
b*	-0.86	-1.55	-1.88	-2.30	-2.57
L*	91.15	90.44	89.95	89.39	89.21
RG Y	8.58	8.69	8.75	8.70	8.80
a*	0.80	1.17	1.39	1.79	2.02
b*	12.94	12.89	12.47	12.15	11.91
L*	35.16	35.38	35.51	35.41	35.60
RF Y	7.28	7.01	7.01	7.27	6.84
a*	-7.22	-7.65	-7.86	-8.36	-7.75
b*	16.30	15.58	14.80	14.55	13.64
L*	32.43	31.84	31.83	32.41	31.45
RES	2.20	2.30	2.38	2.41	2.42
Haze	0.18	0.24	0.51	0.48	0.58

	6 min
T%	81.63
a*	-1.57
b*	-0.45
L*	92.41
RG Y	7.21
a*	-0.56
b*	8.17
L*	32.29
RF Y	6.34
a*	-8.34
b*	12.11
L*	30.25
RES	2.12
Haze	0.15

73

	6 min	8 min	10 min	12 min	14 min
T%	77.50	77.16	77.50	76.69	76.93
a*	-0.41	-0.54	-0.96	-0.73	-1.01
b*	-2.64	-2.72	-2.74	-2.92	-2.74
L*	90.55	90.39	90.55	90.18	90.29
RG Y	9.21	9.40	9.11	9.64	9.36
a*	-3.35	-3.22	-1.87	-3.15	-2.30
b*	14.78	15.25	13.86	15.68	14.20
L*	36.39	36.75	36.19	37.18	36.67
RF Y	7.45	7.64	7.36	7.69	7.34
a*	-10.35	-10.51	-9.48	-10.63	-9.71

62

	6 min	8 min	10 min	12 min	14 min
T%	80.00	79.44	77.19	76.59	75.67
a*	-3.41	-3.65	-4.01	-4.10	-4.38
b*	0.38	0.12	-0.37	-0.66	-0.84
L*	91.69	91.43	90.41	90.13	89.71
RG Y	7.79	7.84	8.16	8.24	8.61
a*	10.82	12.03	11.24	11.50	11.55
b*	1.66	0.67	0.79	0.16	-0.63
L*	33.54	33.65	34.31	34.49	35.22
RF Y	6.60	6.47	6.74	6.78	6.93
a*	3.09	2.92	2.83	3.12	3.90

	6 min
T%	79.46
a*	-1.98
b*	-0.59
L*	91.44
RG Y	8.36
a*	3.42
b*	8.07
L*	34.71
RF Y	7.61
a*	-5.23

Jose Ferreira

28.11.2003 08:37

To: Jean-Marc Lemmer/LuxGuard II/Guardian_Industries@Guardian_Industries, Phil Lingle/STC/Guardian_Industries@Guardian_Industries, Anton Dietrich/STC/Guardian_Industries@Guardian_Industries, Hong Wang/STC/Guardian_Industries@Guardian_Industries, Scott Thomsen/STC/Guardian_Industries@Guardian_Industries, Jens Peter Müller/LuxGuard II/Guardian_Industries@Guardian_Industries, Pierre Pallotta/LuxGuard II/Guardian_Industries, Tom Seder/STC/Guardian_Industries@Guardian_Industries, Tom Georges/LuxGuard II/Guardian_Industries@Guardian_Industries

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Subject: Mottling tests IRR Gen3

Hi everibody,

I just want to give you a brief resume about the special tests made on Wensday, time permitting.

Test list : DOE13b

#32 NiCr's at 18% Tr. (Low oxidation)
#36 NiCr's at 18% Tr. (High oxidation)
#41 NiCr's at 21% Tr. (more metal.)
#54 Switched off one Center Tin cath. & Increased Silicon u/c2 thick. to compensate.
#58 Switched off one Center Tin cath. & added second Zn cathode for Zn u/c2 (doubled Zn layer thick)
#62 Switched off one Si Top cath. & added second Sn cathode for Sn Top (doubled Sn layer thick)
#68 Replaced Top Sn layer by using Zinc/oxide (+- same thickness)
#73 Replaced total Center Sn by Silicon & Top Sn by Zinc/oxide (no more Sn on IRR layer stack)

All those tests have been made in order to detect or improve thermal stability and mottling.

Results

First we have to know that the Transmission drop between 8 & 12 min was > 2.5 % on DOE11 & DOE13.

Exhibit 2